1894. Register No.1073-A.

- 1st Class Torpedo Boat "S O K O L" -

- Built by Yarrow & Co., for Russia.-

- Report, Contract and Specifications.-

(Copy)

Report No.2 of letter No.226. 1/12/94.

Russian Torpedo Boat,1st Class,building at Yarrow's.

---

1. Referring to Reports No.1 and 2 of letter No.223 current series,I have to report that this vessel was to have been laid down a year ago,but there have been many delays,and the last one being the coal strike.

2. The contract was signed in June and the vessel was commenced a week ago.

3. The British Admiralty will not permit any visits of inspection to be made by any foreigners on board of any contract built ships, and this vessel is to be laid down between two Torpedo Boat Destroyers building for the British Government and the Russian and other foreign officials are not allowed to see the vessels building on either side which are almost identically the same as this vessel.

Confidential.

---

Report No.1 of Letter No.223. 27/11/94.

Contract for a Torpedo Boat of the Improved "Havock" Type for Russia.

--

This eleventh day of June,One Thousand Eight Hundred and Ninety Four,the Imperial Russian Ministry of Marine,represented by Captain Z.Rogestoeusky,Naval Attache to the Imperial Russian Embassy in London,from one side,and Messrs Yarrow & Co.,Engineers and Shipbuilders, of Poplar,called hereafter Contractors on the other part,made and entered into the following

Contract.

(1) Contractors undertake to build at their Poplar establishment for the Imperial Russian Ministry of Marine,a Torpedo Boat Destroyer of the improved "Havock" type,designed with a view to secure a greater combination of strength,manoeuvring power,and speed than has been obtained on the "Havock".

The hull of the said vessel,her main engines and boilers,all auxiliary machinery,spare gear,complete outfit,equipment and furnishing,all appurtenances and appliances belonging to the hull as well as to the machinery,to be made in accordance with this agreement,with the annexed specification,to the drawings specified to be approved by the Imperial Ministry of Marine,and in cases where not definitely stated by this contract,or not clearly described by the Specification, to satisfy the requirements of the Russian Inspecting Officers during construction and the Russian Receiving Commission on final inspection.

(2) The Imperial Ministry of Marine have the right to appoint Inspecting Officers to supervise the contruction,and the Contractors have to admit these officers to their Works at all times during working hours and to allot a suitable room for their exclusive use. The Contractors have to give the Inspecting Officers full explanation relating to their design and the construction and to give them every facility and means for ascertaining that all materials and articles are of the best quality and manufacture and of necessary strength, without any faults and defects.

All materials and articles are to stand satisfactorily tests,made at the expense of the Contractors,in the presence of the said Inspecting Officers,and in accordance with the requirements of the annexed specification,or in accordance with the British Admiralty rules and regulations,in cases where not clearly stated by the said specification.

The Inspecting Officers have the right to reject all materials parts,articles and appurtenances,&c.,which have not stood satisfactorily the tests,or that the Inspecting Officers may consider to have faults or defects,or not being in accordance with specification,drawings or conditions of this contract; and the Contractors,on the demand of the said officers,shall replace those rejected by good ones, without any extra pay from the Imperial Russian Ministry of Marine and without any extension of the time stipulated for delivery. The contractors shall have the right to give some secondary work to other firms,but they must communicate the names of these firms to the Naval Attache of the Imperial Russian Embassy in London in order to obtain

his approval of the choice. The Contractors have,in such cases,to get a right for the said Officers to inspect the work during manufacture at the approved sub-contractors premises on the same conditions as at Contractors' own Works. - When ordering materials,parts, or articles,etc.,from approved firms the Contractors must also obtain the consent of the Inspecting Officers with regard to the quality and tests to be applied.

All drawings,in duplicate,before being sent to the work-shop,are to be laid before the Inspecting Officers,not for approval,but for their information only. One photo-copy of the drawings shall be kept by the said Officers and another copy,after being signed by them,for the purpose of certifying that it is an exact copy of the retained drawing,will be returned to the Contractors for sending to the work-shop. If no Inspecting Officer be appointed the above clause is void. It is understood that as regards the design of the vessel and its machinery the Contractors have a free hand.

All drawings which the Contractors undertake to supply under this Contract and Specification,as enumerated hereafter,to the Imperial Ministry of Marine (one set of tracings on cloth and two sets of sun-print copies of same) must be submitted to the Inspecting Officers for signature to certify that they exactly agree with the moulding loft plans and working drawings.

The appointment of Inspecting Officers shall not,however,exonerate the contractors from their entire responsibility for faulty design and calculation,badly executed work,bad articles,or bad materials,and for omissions which may appear during the construction or at the final inspection and trials,as well as during the time of guarantee.

(3). The contractors undertake to deliver the vessel in all respects finished according to the requirements of this contract and specification within sixteen months from the date of signature of the contract. All trials of the hull and machinery are to be made at such early time as to ensure the modifications or repairs (which may be found necessary and may be permitted by the Receiving Commission in

consequence of the results obtained at the final Inspection and trials) to be accomplished and again tested before the expiration of the said sixteen months. The only exonerating circumstances for delay which will be taken in consideration for the corresponding extension of the time of completion are agreed to be:-- fire in so far as it would affect the vessel under this contract; and strike of workmen in so far as it would affect the construction of the said vessel by entirely stopping at the Contractor's premises a work of certain kind. Contractors undertake in the event of the above said fire or strike to notify immediately,in writing,the Naval Attache to the Imperial Russian Embassy in London,so that the extent to which the work is affected could be certified by him in order to obtain the approval of the Ministry of Marine for the corresponding extension of time of delivery.

In case the Contractors fail to deliver the vessel within sixteen months from the date of signature of this contract,unless the delay be due to fire or strike,a penalty shall be deducted from the third instalment at the rate of £8 ($38.93) (eight pounds) sterling per each day of the first month and of £15 ($73.00) (fifteen pounds) sterling per each day of the second and of the following months.

(4). This contract and the annexed specification are intended to include all parts and appurtenances of the vessel's hull and machinery,and all fittings in connection with the hull and machinery usual in ships of the Imperial Russian Navy,so that with the exception of armament and of non-specified victuals and stores,the ship is to be delivered complete and ready for immediate service at sea. It is therefore expressly to be understood that all parts,articles,fittings and appurtenances,which may not be mentioned in this Contract and the annexed specification,but which may be considered by the Inspecting Officers or by the Receiving Commission as requisite for the proper completion of hull and machinery,are to be provided by the Contractors without extra charge. The weight of such non-specified articals (if any) to be allowed for as a portion of the load on trial, it being understood that this does not refer to any essential part of the hull and machinery,but only to addtional fittings,if such be required.

(5) The Contractors undertake to supply to the Imperial Ministry of Marine,at the time of delivery of the vessel,three sets of the following drawings:--

(a) Complete set of drawings showing the vessel's lines;

(b) Structural drawings of profile,amidship and athwartship sections,with details of stem,stern,rudder,etc.

(c) Profile and sections,showing all the under-water apertures.

(d) Plan of decks and hold,longitudinal and transverse sections,showing the disposition of water-tight and other bulkheads,and arrangement of all the compartments and rooms,with their internal fittings;

(e) Drawings of all the pipe arrangements.

(f) General drawings of the boilers,propelling engines,and all the auxiliary,pumping,fan,steering,capstan,distilling,air compressing,electric lighting machinery,steam heating apparatus,etc.

One of such sets is to be tracings on cloth and two others to be sun prints.

A complete list,containing detailed description,weights,and cost of hull,boilers,main and auxiliary machinery,appurtenances outfit,&c., to be supplied by the contractors at the time of delivery in triplicate.

Several designs,showing cabin arrangements and furniture and arrangements of magazines and rooms for storing ammunition,torpedo heads and spare torpedoes,and the appliances for handling the same, as well as the plans showing different position of torpedo tubes on deck,are to be supplied as soon as possible for approval.

(6) The final inspection of the completed vessel,tests of the compartment's watertightness,the stability tests,the steam,speed,and manoeuvring power trials are to be made at the Contractor's risk and expense in the presence of a Special Receiving Commission to be appointed by the Imperial Ministry of Marine. The speed trials to consist of a two and a quarter hour's continuous run at full speed, immediately preceeded by three runs and followed by other three runs on the measured mile with the same full speed.

The mean speed of the vessel during the two and a quarter hours' continuous run is to be 29 (twenty nine) knots per hour and is to be calculated by multiplying the total number of revolutions made during the said two and a quarter hours' run by the mean advance of the vessel per one revolution, to be determined from the above mentioned six runs on such measured mile as is used by the British Admiralty for vessels of similar size. It is clearly understood that the six runs on the measured mile are to be made in addition to the two and a quarter hours' continuous run. The above mean speed of 29 knots is to be realized for the whole period of the two and a quarter hours' continuous run on the full speed trial, with 30 tons dead-weight on board at the commencement of the first run on the measured mile. This dead weight to represent guns, their mountings (exclusive of platforms and and their understructures) and ammunition, torpedo-tubes with their carriages (exclusive of platforms and under structure) and torpedoes, electric light projector (exclusive of the structure for its support) air-compressing machinery (exclusive of its foundation)., crew, boats, anchors, cables, drinking water, provisions, naval stores, and coal. Such dead weight is to be distributed as it might be in actual sea service, or substituted by ballast. In all other respects the vessel is to be completely fitted and equipped during the maximum speed trial, so as all other items are to be considered as forming part of the hull or machinery and are to be complete in their respective places, or ballast to represent them to be carried in their room during the two and a quarter hours' continuous run trial.

To determine the mean advance per one revolution three runs are to be made, as aforesaid, on the measured mile before starting for the two and a quarter hours' continuous run and three other runs on the measured mile are to be made after the expiration of the two and a quarter hours' trial. The number of revolutions during each run on the measured mile is to be taken from a counter with a special disconnecting arrangement of approved design, fitted to each engine. For each of the six runs the ratio of the distance passed through the water by the vessel on the measured basis to the total number of rev-

olutions is to be determined, from which the advance through the water of the vessel per revolution is to be determined in the usual way. The mean of these ratios, counting single the ratios for the first, third, fourth and sixth runs, and counting double those of the second and fifth runs, is to be taken as the advance per revolution.

During the whole time of the full speed trial (whether on the measured mile or on the two-and-a-quarter hours' continuous run and on the possible interval between the point where the two and a quarter hours' run ends and the starting point on the measured mile, when the fourth run begins, as well as on all the turns during the six runs on the measured mile) the opening of the boiler and of the engine stop valves, as well as the degree of the cut-off of the cylindres must not be altered; the pressure of steam in the boilers to be kept constant and not to exceed 235 lbs. per sq. inch, and the air pressure in the stokeholds not to be more than four inches of water. The number of revolutions of the propelling engines is to be as near as possible the same on the measured mile and during the 2-1/4 hours' continuous run as well as during the possible interval between the end point of the two and a quarter hours' continuous run and the measured mile starting point for the fourth run; and the maximum number of revolutions is not to exceed 420 per minute.

In case the mean speed, determined as above, be less than 29 knots, a penalty will be deducted from the third instalment at the rate of £120 ($583.98) sterling for each tenth of a knot, or for any part less than a tenth, between 29 and 28 knots, and at the rate of £200 ($973.30) sterling for each tenth of a knot, or for any part less than a tenth of a knot between 28 and 27 knots. Should the mean speed of the vessel fall below 27 knots, the Imperial Ministry of Marine will refuse to accept the vessel, and the contractors bind themselves to return within one month after such decision, to the said Ministry, the advanced amounts of the first and second instalments.

After the satisfactory results obtained at the final inspection and trials, and after the delivery of the drawings mentioned in Clause 5, the Receiving Commission shall give to the Contractors a certificate

entitling them to receive the payment of the third instalment,which payment,however,is to be made at the time the vessel is handed over in London to the Officer of the Russian Navy appointed to command.

(7). The Contractors undertake the responsibility for the vessel during a period of six calender months,counting from the date of delivery,and agree that if during the said period there shall be discovered in any part of the hull,boilers,propelling and other machinery and fittings,any defects arising from the design,construction, quality of the articles or of the materials employed,or bad workmanship,the part etc.,etc.,shall be renewed at the Contractors' expense, or by the Contractors,in the shortest time necessary for the construction and delivery of the same at the Russian port. Such time to be added to the period of guarantee.

The Contractors will be allowed if they so desire,to appoint an engineer on board the ship for the six calender months of the guarantee time; but it is to be understood that this engineer is not to interfere with the discipline of the ship or with the working of the machinery,etc.,unless requested to do so. The expense connected with such an appointment is to be borne by both sides: the travelling expenses,etc. are to be paid by the Contractors and the wages are to be paid by the Imperial Ministry of Marine at the rate of 15 (Fifteen Pounds) sterling per calendar month during commission or 10 (Ten Pounds) sterling per calendar month when the ship's crew is paid off.

(8). Clause 9 of this contract provides for two advance instalments to be paid by the Imperial Ministry of Marine,therefore the Contractors declare hereby that the vessel whether finished or unfinished and all such articles and materials at the Contractors' premises as may be required by the Contractors and intended for the construction of the said vessel shall become the exclusive property of the Imperial Russian Ministry of Marine. The Contractors must keep during construction,the said vessel insured against fire in one or more of the most trustworthy insurance offices,or at Lloyds,on their account, and in the name of the Naval Attache to the Imperial Russian Embassy in London,the Policies,which are to be for the amount of each of the

two advance instalments,being taken out for the full term of the contract and being deposited with the said Naval Attache at the time of making application for each instalment.

(9). The Imperial Russian Ministry of Marine have to pay to Messrs.Yarrow & Co.,according to the fulfilment of the requirements of this Contract,for its approved and complete execution,for the expenses connected with inspection and trials,and for the insurance of the Torpedo Boat Destroyer,the sum of £36,000 (Thirty Six Thousand Pounds) sterling,less 781 Russian Paper Roubles (Seven Hundred and Eighty One R.P.R.),for the Russian Government stamp duty under this Contract,the above said amount being sub-divided into four instalments,payable after the certificate of the Inspecting Officers or of the Receiving Commission about the satisfactory completion,in accordance with the following terms of each instalment.

1st.-- £12,000 (Twelve Thousand Pounds sterling),less R.P.R.781 (Seven Hundred and Eighty One paper roubles) for the Russian Government stamp duty,to be paid after the drawings mentioned in Clause 5,as being subject to approval,have been handed over to the Imperial Ministry of Marine and an Inspecting Officer's certificate issued stating that all the frames are up and the cylinders bored,both frames and cylinders having been passed.

2nd.-- £11,000 (Eleven Thousand Pounds sterling) upon the Inspecting Officer's certificate stating that the machinery is erected in the Contractors' workshops,boilers tested,and the hull rivetted up to and including the gunwale,all such work having been passed.

3rd.-- £11,000 (Eleven Thousand Pounds sterling), or balance,after deduction of penalties under this contract,if any, to be paid after the vessel has been handed over to the Russian Naval Officer appointed to command her.

4th.-- £2,000 (Two Thousand Pounds sterling),or balance,after de-

duction of possible charges for making good defects which may arise under Clause 7 of this Contract, to be paid after the expiration of the guarantee time.

(10) The Contractors are hereby bound not to transfer or assign this Contract. It is also agreed that the Contractors shall be responsible for the payment of royalties, should there be any infringement of patent rights in the execution of or in performance of this contract.

(11). Chief superintendence upon the fulfilment of this contract is entrusted to the Naval Attache to the Imperial Russian Embassy in London, to whom it is to be referred for any explanations, and through whom all payments will be made.

(12). If during the course of this contract any difference or dissension shall arise between the representatives of the Imperial Ministry of the Marine and the Contractors respecting the interpretation or execution of this contract during trials or during the period of guarantee, the Contractors have to appeal direct to His Excellency the Minister of Marine, whose official decision shall be final and without any further appeal.

(13). The Contractors agree to print this contract and the annexed specification on their own account and to give thirty copies of it to the Imperial Ministry of Marine.

On behalf of the

Imperial Russian Ministry of Marine.

Signed:

For Messrs. Yarrow & Co.

Signed:

Witnesses.

Confidential.

Report No.2 of Letter No.223. 28/11/94.

Specification for a Twin-Screw Torpedo Boat for the Imperial Russian Navy.--- by Yarrow & Co.

Length of hull (not less than) - - - - - 180 ft.

Beam, - - - - - - - - - - - - - - - - - - - - 18 ft. 6 ins.

Depth amidships (from keel to centre of deck) - - - - - - - 11 ft. 6 ins.

The Hull to be specially designed with a view to secure the greatest possible combination of strength, speed and manoeuvring power.

Skinplating to be of the very best Siemens-Martin tough steel, carefully moulded to the form of hull and where practicable hammered into shape cold. Amidships the plating to be eight lbs.per superficial foot for shear strake: the remainder amidships to be six pounds per superficial foot, tapering to the ends to four lbs.per superficial foot. The plating shall be so proportional that the total weight of the skinplating shall be 10 per cent. less than in the "Havock".

The Keel is to be seven lbs.amidships, tapering at the ends to five pounds per superficial foot.

The Stem and Stern to be of forged steel, the stem having the shape of a ram and being efficiently strengthened to allow for ramming vessels of a similar class.

The Rudder Frame to be of forged steel.

Rivetting. Vertical and horizontal seams for skinplating to be double rivetted throughout, except the vertical seams amidships (for one-half the length of hull), of the keel, shear and gunwale, which shall be treble rivetted. The rivets mostly to have countersunk heads and hammered down on the inside. Above the waterline on the side plating the rivets may have heads on the outside projecting beyond the skinplating, hammered down on the inside. The upper vertical seams amidships shall be provided with butt strips inside and out to secure a double shear to the rivets and greater continuity in the strain, as adopted in the highest class boiler work.

Rivetting of Steel Deck. All transverse seams amidships to be double rivetted and longitudinal seams to be single rivetted.

Frames to be of Siemens-Martin steel,not more than twenty-one inches apart,two-and-a-half inches by one-and-three-eighths of an inch by one and-three-quarter lbs.per foot under engines and boilers and one-and-three-quarter inches by one-and-three-eighths of an inch by one-and-an-eighth lbs. forward and aft,doubled under engines.

Reverse Frames to every frame,rivetted to the top of floor plates and running alternately to the underside of beam gussets and bilge, inch-and-three-quarters by an inch-and-three-eighths by one-and-an-eighth lbs.amidships,and an inch-and-a-half by an-inch by seven-eighths lb.forward and aft. All reverse frames in engine room to run up to the gunwale. The scantling of the frames and reverse frames may be of a different sectional area,provided their collective section is not reduced.

Floor Plates to be of steel,nine inches deep by six lbs.per superficial foot under machinery and seven inches deep by four-and-a-half lbs. per superficial foot forward and aft.

Beams to be of steel of the same size as the frames,one to each frame,or equal sectional area.

Bulkheads,to be of steel,ten in number,making eleven compartments,varying from five-thirty-seconds of an inch thick for the bottom plates of the amidship bulkheads to two-and-three-quarter lbs.per superficial foot for the top plates of the amidship bulkheads,and for the bulkheads forward and aft from three-thirty-seconds of an inch at the bottom to two-and-a-half lbs.per superficial foot at the top. These bulkheads to be suitably stiffened by vertical angles. The longitudinal strength of the coal bunkers shall be partially continued on through the engine room by means of longitudinal stringers,secured to the underside of deck and to the bottom plating,where they shall run into and form the engine foundation. These stringers shall taper in depth from the forward engine room bulkhead to the after engine room bulkhead: the mean depth to be about twelve inches by three-thirty-seconds,or equal sectional area. The transverse bulkhead to be water-tight.

Steel Deck. A slightly curved steel deck to extend from the conning tower forward to the stern, the gunwale plating being eight-and-a-half lbs. per superficial foot amidships and the rest to vary from five-and-three-quarter lbs. per superficial foot amidships to three-and-a-quarter lbs. at the ends, except the turtle deck, which, owing to its curved form, having considerable set, shall be two-and-three quarter lbs. per superficial foot.

Middle Line Stringer to extend as far forward and aft as the form of vessel will allow and to consist of steel angles, two-and-a-half inches by an inch-and-a-half by two lbs., or equal sectional area, rivetted back to back and well rivetted to keel plate.

Keelsons to be two in number and to extend forward and aft for about three-fifths the length of the vessel. To consist of three angles, one-and-a-half inches by one-and-a-half inches by an eighth of an inch, or equal sectional area, one angle being secured to the boat's bottom between the frames and the other two angles rivetted to the keelson plates and to the reverse angles.

Conning Tower shall be placed forward as shown, the entrance being at the after side and the forward portion open into the forward cabin below the turtle deck.

Galvanizing. The outside plate to be galvanized below waterline and one foot above waterline, and the turtle deck plates to be galvanized throughout.

Handrailing to consist of galvanized forged steel stanchions made solid or hollow, provided with guard rails, and made portable and stayed where necessary.

Lower Deck forward to be of steel plates, two-and-three-quarter lbs. per superficial foot, except the plates on each side of this lower deck, which are to be three-and-a-quarter lbs. per superficial foot, extending from the collision bulkhead up to the bulkhead forward of the boiler room.

Skylights with movable steel shields, and hatchways, and ladders, to be provided where required. Deck doors to be mostly circular, with coamings round them, for the sake of maintaining the strength of the

deck-plating. To be furnished with gun-metal rings and turned covers, so as to be as nearly tight as possible without the use of india-rubber.

Deck Doors in the vicinity of the compass to be of bronze, so as to avoid their affecting the compasses when either opened or closed.

Sluice Valves, Hand Pumps, Pumping Arrangement, Messing and Berthing Arrangement, Officers' and Seamen's W.C.'s, Pantry, Lavatories, Shoots and Rails for loading torpedoes, steps to side magazines, store rooms, &c., Arm Racks and Boxes to be provided.

Bunkers to extend throughout the boiler compartment and to have a capacity of about 55 tons of coal, but not less than 50 tons.

Reserve Feed-Water-Tank, capable of holding two tons of fresh water, shall be placed low down in the vessel in engine room and is to be fitted with filling pipe from deck as well as with an air pipe.

Bilge Ejectors. There shall be six large bilge ejectors, placed in the six central compartments, of 60 tons capacity per hour each.

Pumping Arrangements. In addition to the bilge ejectors there shall be a three-and-a-half inch quddruple acting hand pump on deck, placed amidships. Section pipes leading from it to the seven central compartments to be of wrought iron or steel galavanized, and sluice valves provided to all the additional compartments.

Cabin Arrangements to be as approved by the Imperial Russian Ministry of Marine, and supplied with usual furniture, bedding, folding-up lavatories, mirrors, lamps, &c.

Signal Mast, with yard, to be provided, which at the time of trial shall be laid down but not withdrawn from board.

Ventilation to be provided by means of a required number of cowls fitted with valves at their lower extremity to keep out the water.

Magazines and Storerooms, as well as stowage for two spare torpedoes to be provided, with all necessary fittings to the requirements of the Imperial Ministry of Marine.

Steering Engine and gear to be supplied with two steering wheels, both worked by steam, and the after one by steam and hand. The after steering wheel shall be placed as shown on design and the forward, to be worked from inside the conning tower. All moveable parts of the

steering gear in the vicinity of the standard compass to be made of non-magnetic material.

Steam Capstan and gear arranged to work the chain cables and the wire rope by steam as well as by hand,and a complete arrangement for catting and fishing the anchors. 10 cwt. to be allowed as part of the load on trial for the difference of weight between steam and hand capstan,as provided to "Havock" and "Hornet".

Telegraphs of the usual repeating type (Chadburn's make) to be supplied between the conning tower and the engine room (one to each set of engines) between the engine room and the stokeholds,and between the after steering station and the engine room.

Voice Pipes to be supplied as may be required by the Imperial Ministry of Marine,and all necessary Air Service Pipes and Charging Columns to be provided.

Deck and Scuttle Lights,with dead lights,to be supplied.

Steam Heating of an improved type to be fitted.

Electric Light Machinery. One set of apparatus,by W.H.Allen & Co.,or other approved maker of approved type,consisting of an engine and dynamo for producing the electric light,to be provided and fixed in the ship,together with all necessary pipes,connections,appurtenances,cables,wires.The arrangement to be adapted for producing a current of 80 volts and 50 amperes when making about 650 revolutions per minute. Wires to be led to search-light,which latter is not included in the contract.

Air Compressing Machinery to be made by Messrs.Brotherhood,or other approved maker. The complete set to be capable of filling a receiver of 10 cubic feet capacity with air at 1700 lbs.per sq.inch in 70 minutes,with a maximum steam pressure of 150 lbs.per sq.inch the revolutions per minute,as may be approved by the Inspecting Officer.

Distilling Machinery, as described in the machinery specification.

All exposed Steel Work in the cabins and living spaces shall be cork-cemented.

Painting. The entire vessel to be painted with three coats of paint,both inside and out,the bottom being covered with approved composition.

Quality of Materials and Tests. All plates,angles,bars,ties,&c. entering in the construction of hull are to be of steel of considerably greater strength than usually required by the British Admiralty rules for testing the materials (and costing two-and-one-third times that of mild steel). The breaking strain of steel provided under this specification shall be from 37 to 44 tons; extension not less than 15 per cent,measured on 8 inches. Bending qualities to be such that the material shall bend without cracks to an angle of 180 degrees over a radius of twice the thickness of the piece tested. Should any portions of the hull be made of the usual (approved by the British Admiralty rules for testing) mild steel,those portions shall be increased in thickness by 10 per cent. above the herein specified. The steel of the increased strength is to be free of the slightest surface defects. All other materials have to satisfactorily stand the British Admiralty Tests. Water testing,is to be made in accordance with those rules,i.e.,in accordance with British Admiralty rules. The tests of material of which the hull is composed to be carried out at the place of manufacture. The same applies to the auxiliary machinery.

Armament. It is proposed for the vessel to carry one 75 mm.gun on the forward conning tower,two 47 mm.guns forward for direct-ahead fire and one 47 mm.gun aft; also two torpedo guns. This armament is not included in the present contract,but all the necessary strengthenings to receive the above armament are included and are to be made similar to those adopted on the "Havock," which have proved thoroughly efficient. To protect the two forward 47 m.m. guns a bulwark should be fitted and the turtle deck arranged accordingly. The magazines are to be fitted so as to receive (1) Forty cases with 160 rounds for the 75 mm.gun; (2) Eighty cases with 800 rounds for the 47 mm.guns.

Design showing position and distribution of magazines to be submitted for approval to the Ministry of Marine. The torpedo tubes are

to be 22 ft.in length. Four Whitehead torpedoes,15 inches in diameter and 19 feet long are to be carried and necessary room under the deck and efficient means for easily lifting two of them through the conning tower door are to be provided,as well as room and appliances for stowing the torpedo heads. At the time of testing the stability ballast weight equal to the weight of the above armament is to be provided and stowed in place of it,in addition to that in lieu of the crew (43 men),their luggage,provisions,naval stores,55 tons of coal, and all articles and items of the equipment,outfit,&c. Under such full seagoing load the vessel's metacentric height is to be not less than 2.1.

----:----

## Outfit, etc.

The following articles of outfit,etc. are to be provided,of British Admiralty patterns,except where otherwise approved by the Imperial Ministry of Marine.

Corticine for upper deck and linoleum for cabins;

Watch bell;

Chart table;

Signal lockers,chronometer and compass boxes;

Galley and cooking utensils,suitable for 6 officers and 37 men;

Pantry; electro-plate,glass,and china service for breakfast;luncheon, tea,coffee,and dinner,with complete sets of spoons,forks, knives,&c. for 6 officers.

Coal Box;

Cook's tables and larder;

Awnings and fittings complete;

Tanks for drinking water to contain 400 gallons;

Oil and store tanks;

Cordage reels,log reel and fittings;

Boats: one 24 ft. whaler of light construction and two 20 ft.Berthon boats with outfit complete and canvass covers;

Boats' davits complete with griping spars,blocks,falls,guys,&c.;

Canvass covers for torpedo tubes,guns,compasses,&c.

Two compasses and stands;

Life buoy (12 in number);

50 life-jackets.

1 night life buoy;

Lockers for stoker's dirty clothes and wash-deck gear;

Fittings for masthead,anchor,and bow lights;

Complete set of lights (including two masthead red lights);

Flagstaffs fore and aft;

Anchors; Two 6 cwt. and one 2 cwt.;

Cable: 100 fathoms three-quarter inch cable complete with shackles, swivels,&c.;

100 fathoms three-inch steel wire rope with swivels;

Hawse pipes,bollards,riding bitt,bow-stoppers,transporting chocks, deck pipes; ground chains,catting chains,towing arrangements;

Chain locker forward;

Oil lamps for internal lighting,as may be required by the Imperial Ministry of Marine;

Deck pipes,slips,clenches,wire rope compressor,reel for wire rope, fitted with brake attachment;

Platforms and all necessary strengthenings to hull for guns and torpedo tubes;

Torpedo davits,fitted with Bastert's winches,wire pendants guys,&c.;

Fittings for stowing torpedo warheads and exercising heads;

Leads,supports,holding-down rings,resistance cut outs,terminal boxes for the electric light projector;--

Machinery.

To consist of two sets of vertical inverted cylinders,triple-expansion engines,each driving an independent screw.

Cylinders. The diameter of the high pressure cylinders to be not less than 18 inches,that of the intermediate cylinders not less than 26 inches,and the diameter of the low pressure cylinders not less than thirty-nine-and-a-half inches; the length of the stroke to be 1 ft. 6 ins. capable of indicating not less than 3,800 H.P. collect-

ively,when working at not more than 400 revolutions per minute,and when indicating more than 3,800 the number of revolutions may be augmented,but in no case exceeding 420.

Cylinders to be made of hard close-grained cast iron,not connected together by any steam-joints. The steam ports to be stayed by steel screwed stays where necessary,and all other parts to be properly stayed.

Cylinder Covers. These to be of cast steel,manganese,or aluminium-bronze.

Cylinder Fittings. Suitable drain cocks,or valves with separate pipes,lead as approved,to be fitted to each cylind r and valve casing, and escape valves of British Admiralty pattern to be fitted to the top and bottom of each cylinder. The cylinders to be neatly lagged with asbestos and sheet aluminium,and suitable apparatus to be provided for taking diagrams; also the indicators,with springs; pressure gauges &c. No diagrams to be taken during the 3 hours full speed trial.

Receiver Pipes. The receiver pipes between the cylinders are to be fitted with compound gauges,also relief valves,loaded to blow off at as low a pressure as is found practicable.

Valves and Gear. The valves to be of the piston type,of cast iron for high pressure,and of manganese bronze,or aluminium-bronze for intermediate and low pressure. The valve casings are to be so arranged that the valves may be conveniently removed,replaced,and adjusted. Double eccentrics are to be used for working these valves and means provided with suitable indexes for fixing the gear in any position. All levers,rods and shafts to be of wrought ingot steel, and links of forged ingot steel or forged iron case hardened. Drain cocks are to be fitted to the valve chests where necessary. Starting platforms to be on each side of the engines near the ship's side.

Engine Frame Work to consist of forged ingot steel columns and longitudinal steel angles connected together by girders made of manganese or aluminium-bronze.

Starting Valves. Auxiliary starting or pass valves are to be fitted to facilitate the handling of the engines and the handles for these,with suitable indexes,are to be worked from the starting plat-

forms. All handles,wheels,and levers for manipulating the main engines and the drain cocks are to be within easy reach of the starting platforms. No pass or auxiliary starting valves are to be used during the full power of machinery for the pur ose of increasing the supply of steam to cylinders.

Pistons to be of forged steel. To be turned up throughout and fitted with packing rings,and steel nuts on the piston rods.

Piston Rods and Guides. The piston rods are to be hollow,of forged ingot steel,and the rubbing surfaces of the piston rod guide are to be of steel working against gunmetal or white metal and to be easily adjustable.

Glands and Stuffing Boxes. All the stuffing boxes are to be as deep as possible,and fitted with gunmetal rings and bushes and those for the piston rods to be provided with loose gunmetal rings to allow of lateral motion.

Connecting Rods are to be of forged ingot steel bored out. Length between centres to be not less than 40 inches. The crank ends of the connecting rods to be made as wide as practicable to give effective support to the brasses and to be fitted with forged steel caps. The top ends of the connecting rods to be forked,and the bearings to be lined with white metal at the crank ends. Gudgeon pins for the top ends of the connecting rods to be of forged iron or forged steel case-hardened and ground up perfectly true.

Material and Construction of Shafting. The crank and propeller shafts and bolts are to be of steel forged from solid ingots supplied by a maker approved by the Naval Attache to the Imperial Russian Embassy.

Crank Shaft and Bearings. The crank shaft brasses are to be lined with white metal and so fitted that they can be taken out without necessitating the removal of the shaft. Revolving balance weights to be fitted to the crank shafts,proportioned in conformity with most recent improvements,so as to neutralize as far as practicable all vertical vibration.

Thrust Collars and Thrust Blocks. The thrust collars,forged solid with the shaft,shall bear against white metal,and efficient water

service arrangements are to be made to obtain an ample supply of water to them. The oil service to the collars to be independent of the water service.

Stern Tubes. Short stern tubes to be provided passing through the skin of the vessel,made of steel lined with white metal (the white metal lining must be in separate bush to enable it to be replaced without disturbing stern tubes). The stern bush in the brackett carrying the outer end of the shaft to be lined with white metal of at least 25 inches in length.

Screw Propellers. To be three-bladed,of forged steel,manganese or aluminium-bronze,about 6 ft.6 ins. in diameter. The blades are to be separately attached to the bosses by keys,as usual. Propeller bosses are to be carefully fitted and securely fastened to the shaft by a feather key and closed gunmetal nut with stopper.

Gear for Turning Main Engines. Similar arrangements to those adopted in the "Havock" are to be made for enabling the main engines to be turned by hand.

Condenser. There shall be one surface condenser,made of copper by the Elmore process,to ensure a hard material,perfectly cylindrical, without joint. Suitable pipe connections with shut off valves are to be fitted between the main steam pipe and main exhaust pipe and condenser to be used as the silent blow-off when the engines are suddenly eased or stopped. The exhaust pipes from the various auxiliary engines are to deliver into the condenser through a separate valve. The condenser tubes to be solid drawn. Tube plate to be of Muntz metal or bronze provided with screwed glands and packings for the tubes,with a lip to the ferrules to prevent the tubes slipping through the plates. Inlet and outlet pipes to be provided with suitable valves and the inlet opening to be fitted with a strainer which can be easily removed. The inlet and outlet valves are to be made of gunmetal or bronze or aluminium. Gauge glass,drain valve,soda cock, safety valves and auxiliary feed valve are to be fitted. Manhole and handholes are to be provided for cleaning and examining condenser and tubes. Condenser is to be so arranged that the tubes may be readily

packed at each end and taken out without removing any part of machinery which cannot be removed or replaced with facility.

Circulating Pump. A circulating pump of centrifugal type shall be fitted as shown in the general design, arranged to pump water from engine and boiler room bilges. Auxiliary feed arrangements are to be fitted for the supply of water from the fresh water tank.

Air Pumps. Each engine shall be provided with an air pump with bucket, seats and guards for foot and discharge valves: these to be of gunmetal, bronze or aluminium. The buckets to be provided with efficient packing rings. Air pump rod to be of Manganese-bronze. India rubber valves are to be of British Admiralty mixture and to pass Admiralty tests.

Feed and Bilge Pumps. To be worked off the main engines, or as may hereafter be determined, should it be deemed desirable for these pumps to be worked independently.

Feeding Arrangements. One independent donkey to be provided to each boiler, as adopted in the "Hornet," in addition to the main pumps on the engines. This pump is to have a separate delivery pipe with a check valve on the boiler. An auxiliary feed engine to be provided in each stokehold, which shall take its suction either from the reverse tank or from the sea, in addition to the extra feed to the condenser, and to have an independent feed delivery. All pumps with their valves, boxes and fittings are to be of gunmetal.

Feed Heater. A feed heater to be supplied, of copper, for the purpose of heating the feed water prior to its delivery into the boilers.

Grease Extractor. A grease extractor for the feed water to pass through is to be fitted: this to form part of the hot well, or of the feed heater, or both.

Lubrication. Complete and approved lubricating and water service arrangements are to be fitted throughout the whole of the machinery (main as well as auxiliary) to the satisfaction of the Imperial Ministry of Marine.

Revolution Counter. Two revolution counters of approved type are

to be supplied and fitted to main engines to register up to one million.

Fan and Fan Engines. There shall be provided two fans and fan engines,placed in the most convenient position practicable for supplying air to stokeholds.

Engine room Fittings. To comprise cupboards,spanner racks and spanners for all bolts and nuts about the engines and boilers,fenders and guard rails,vice and bench,lamp brackets and lamps,eight-day English lever clock in air-tight case,gear for lifting cylinder covers. Tanks to be supplied and fitted to hold engineer's stores,with filling pipe and lock cocks; save-alls for oil cans.

Clothing of Pipes. All steam pipes throughout the boat to be covered with non-conducting material.

Arrangement of Pipes. It is proposed that the steam pipes for each engine should be quite independent of one another,one set of boilers supplying steam for one set of engines and the other set the other engines,cross pipe connections being fitted,with necessary valves,in case of need. Steam and other pipes to be of copper,in thickness and quality corresponding to British Admiralty rules. It shall be optional with the Contractors to use for straight pipes steel with flanges welded on. All bends and tie pieces to be of gunmetal. Steam pipes of copper,above four-and-a-half inches diameter,to be wound with copper wire and to have bronze flanges turned and faced.

Evaporator and Distilling Condenser. An evaporator by Messrs. Caird & Rayner,or ather approved maker,to be supplied and fitted,capable of producing three-and-a-half tons of water per 24 hours extra to that condensed from the boiler,and an approved distilling condenser to condense one ton of pure aerated fresh water in 24 hours,together with all necessary connections.

Boilers of Yarrow's patent water-tube type. The number of boilers shall be six or eight,at the contractors option. They shall be provided with steel tubes and tested by water pressure to 130 lbs. (in the workshop) above the working pressure,which shall not exceed 235 lbs.per square inch. Any further tests on board to be made at such pressure as accords with British Admiralty rules. Each boiler shall

consist of a top steam chamber and two water chambers below, the top and bottom chambers being united by straight steel tubes, solid drawn. The covers of the top chamber and the covers of the lower chambers to be of cast steel.

Boiler Fittings. Each boiler to be supplied with two safety valves, loaded to five lbs. in excess of their working pressure with approved lifting gear from stokehold and deck, one main stop valve, two water gauges of British Admiralty pattern, bottom blow-out valve, two pressure gauges, donkey stop valve, drencher, internal steam pipe, and necessary non-return valves.

Safety Apparatus to be fitted by means of non-return air valves to protect the men in the stokehold from flame and steam, in the event of any accident to any internal part of the boilers. These air flaps to be placed in such a position that they shall not be distorted by the heat of the fire.

Tests for Quality of Steel. The tests for the quality of the steel and other materials to be used throughout the machinery shall be in accordance with the British Admiralty regulations corresponding to the various materials adopted, except where otherwise clearly specified. All the tests are to be made in the presence of and to the entire satisfaction of the Inspecting Officer, and to be carried out at the place of manufacture.

Spare Gear. Spare gear shall be provided as per the annexed list and the several articles shall be accurately fitted and tried in place, and usual engine room outfit to be provided.

Materials and Workmanship. The whole of the work supplied shall be of the very best materials, and the very highest class workmanship and finish only shall be employed in its construction and fitting; but the Contractors shall reserve to themselves the option of using such lighter, stronger and most costly materials as modern experience indicates, such for example as aluminium, aluminium bronze, etc. in substitution for such materials as are customarily used.

Where the words "brass" or "Gunmetal" are used these terms are to be understood to include aluminium-bronze or manganese-bronze.

Water Tests. Boilers, cylinders, feed pumps, condensers, steam, feed, and other pipes are to be tested by hydraulic pressure in the presence of, and to the entire satisfaction of, the Russian Inspecting Officers.

Engine Room Telegraphs. Besides the two telegraphs from the conning tower to each engine, telegraphs from engine room to boiler rooms are to be fitted.

A steam siren is to be supplied and fitted.

## List of Spare Gear.

### Main Engines.

Such of the following articles as the Contractors may think desirable, with the approval of the Inspecting Officer, shall be carried on the official trial:--

3 bolts and nuts complete for one shaft coupling;

30 bolts with nuts (assorted);

One-half brasses for air pump (top end);

One brass bush (bottom end);

2 bolts and nuts and pair of brasses for connecting rod;

2 bolts and nuts and pair of bushes for piston rod;

2 bolts and nuts for eccentric rod;

2 bolts and nuts and one pair of brasses for main bearing;

1 complete set of bushes for link motion (for both engines);

30 condenser tubes;

30 condenser glands;

One complete set of tapes for condenser, together with tape mandril and gland driver;

One eccentric strap with rod complete;

One piston rod nut;

One set of spare piston rings for each cylinder;

One set of piston rings for each valve; (piston).

One set of propeller blades for each propeller;

One twentieth set of studs with nuts for cylinder and slide covers.

2 sets of valves for air pump;

1 set of feed pump check valves;

Boilers.

1 set of fire-bars and bearing-bars for one boiler;

25 spare boiler tubes;

12 gauge glasses with washers;

6 tube stoppers;

1 safety valve spring.

Steering Engine.

1 set connecting rod brasses,bolts,nuts,and pins complete;

1 eccentric rod and strap,or corresponding parts;

1 set of piston rod brasses,bolts,nuts and pins,complete;

2 sets piston rings.

For the Electric Light Dynamo.

Brushes complete for dynamo (2 sets);

2 sets piston rings;

Brasses or brushes for working parts of engine and dynamo (one pair,or member,for each fitted);

1 Spring for each fitted.

1 set special spanners;

1 eccentric strap for each fitted;

1 piston rod complete;

1 slide rod complete;

For Evaporator and Condenser.

Brasses or bushes for engine,shaft,crank-pin,with bolts,and gudgeon bearing one set;

Piston rings (1 set of each kind);

Pump valves (one of each size fitted);

1 set special and ordinary spanners;

1 spring for each kind fitted;

1 piston rod complete;

1 slide rod complete.

For Fan Engines,Feed Engines,and Circulating Engine.

1 set of brasses;

Eccentric straps complete;

Piston rings for cylinders;

1 slide valve and slide rod.

For Air Compressing Machinery.

1 pair connecting rod brasses with bolts;

1 piston rod;

1 set brasses for piston rod crosshead;

1 pump rod;

1 slide valve rod;

1 eccentric rod and strap complete;

1 set valves for pump;

Leather presses, complete;

6 sets of leathers for pump;

1 set of spanners;

1 set of apparatus for testing pumps;

12 studs, bolts, and set screws (assorted).

Confidential.

Report No.1 of Letter No.123. 22/7/95.

Destroyer Drawings.

94 Reg. No. 1173 A-E-I.

1. Referring to the tracings sent with letter No.91, and to an attempt to get drawings of the screws in detail, it has been found that Messrs. Yarrow & Co. have ordered several sets, six or eight, of screws to try with a view to obtain the best results for this boat.

2. I don't think the Russians care for a competitive trial at highest speed of the several screws, and have so expressed themselves, thinking it hard on the boat.

Report No.1 of letter No.160. Sept.30th,1895.

The "SOKOL" Russian Torpedo boat destroyer.

1. Referring to the confidential plans sent with letters Nos.34, 90 and 91, current series, and to the clipping attached hereto, a few details of interest concerning this fast little vessel may be added.

2. Torpedoes. The bodies are stowed in the forward compartment. Directly underneath them and handy,and as far below the waterline as possible are the war-heads. To run the torpedo aft there is a small railway track (18 inch gauge) to the racers,laid on the starboard side of the deck from just abaft the conning tower to the after racer. The crown of the deck being considerable,the outboard rail is set up a few inches to make the track level.

3. Search Light. This is just forward of the forward stack, on a semicircular track crossing the torpedo track on the starboard side.

4. Steam Steering Engine, Wheel Ropes,etc. The steering gear is steam changing to hand aft,by pulling the wheel towards you when standing naturally to steer. Pushing the wheel forward and engaging a toothed gearing,you steer by steam. The tiller is shipped on deck like all YARROWS boats and a single part of wire is made fast to the tiller runs to a fair leader on each quarter,and then a few feet forward where a metal block is turned in and through this is led the bight of a 1/2 inch chain,one end going to the wheel on deck aft--spoken of above--and the other end passes forward to abreast the after engine room bulkhead where it passes down through fair leading tubes and runs direct to the steering engine,which is near but not attached to the after engine room bulkhead on the port side,as to prevent vibration it is fastened to the deck above and out to the port side. The wheel ropes from the forward wheel in the conning tower are steel rods geared into one another,running aft under the deck to the steering engine.

5. Guns. There is one 75 mm. on conning tower and three 47 mm., two just abaft conning tower and one aft.

6. Anchors and Chains. She carries three patent anchors the bowers being Martin's patent of 6 cwt. The starboard cable is of three inch wire with a swivel about a fathom from the anchor. The port cable is of chain about one inch. The third a Parker patent anchor of 2 cwt. is stowed amidships.

7. The Windlass is steam or hand, there being a small engine covered in on forecastle, just abaft the windlass.

8. Some of the fittings where strength is not especially required, are of Aluminium for lightness, such as four small ventilators aft, combings of fire and engine room hatches, the hinged spring covers of these hatches being of steel. The lagging covers for tops of cylinders are of aluminium--other aluminium fittings are mentioned in the clipping.

9. Officers and crew; Captain, Chief Engineer, Torpedo Lieutenant, two watch keeping Lieutenants, and 38 men. The petty officers living in a compartment abaft the officers quarters and the rest of the crew in the forward compartment under the conning tower. No surgeon is carried but one of the crew is a nurse, trained in a hospital.